

In the Claims:

1.-11. (canceled)

12. (new) A fuel cell stack, comprising:

a plurality of fuel cells arranged in a stack, each of said fuel cells being of polymer electrolyte membrane construction and comprising a membrane electrode assembly,

each of the fuel cells defining a plurality of essentially parallel channels for conducting cooling fluid between adjacent membrane electrode assemblies, each of said channels having two open ends, wherein a direction of flow of one of said channels is opposite to the direction of flow of adjacent ones of said channels in said each of said fuel cells.

13. (new) The fuel cell stack of claim 12, wherein each of said channels has an inflow side and an outflow side, said fuel cell stack further comprising a common collector channel, wherein one of inflow sides and outflow sides of said channels that are arranged one above the other are connected in said common conductor channel.

14. (new) The fuel cell stack of claim 13, further comprising a plurality of common collector channels arranged in parallel on two sides of said fuel cell such that each of the one of inflow sides and outflow sides of said channels run into one of said plural common collector channels.

15. (new) The fuel cell stack of claim 12, wherein said plural channels are arranged exclusively for cooling said fuel cells, said plural channels conducting one of a gas and a fluid.

16. (new) The fuel cell stack of claim 12, wherein each of said membrane electrode assemblies comprises an anode electrode and a cathode electrode, wherein said channels are open toward said cathode electrode and conduct an oxygen supply toward said cathode electrodes.

17. (new) The fuel cell stack of claim 12, wherein each of said membrane electrode assemblies comprises an anode electrode and a cathode electrode, wherein said channels are open toward said anode electrode and conduct a fuel supply toward said anode electrodes.

18. (new) The fuel cell stack of claim 12, wherein said channels have a width of less than 3 mm.

19. (new) The fuel cell stack of claim 18, wherein said channels have a length in the range 20 mm to 200 mm.

20. (new) The fuel cell stack of claim 13, wherein said stack comprises a recess at an end thereof forming said common collector channel.

21. (new) The fuel cell stack of claim 13, further comprising an elastic sealing edge surrounding a bipolar plate of said each of said fuel cells and arranged between adjacent fuel cells, said common collector channel being formed by recesses in said sealing edges lying above one another.

22. (new) The fuel cell stack of claim 12, wherein said channels are arranged such that an adequate supply of coolant is supplied with an excess pressure of 0.1 to 10 bar.

23. (new) The fuel cell stack of claim 13, wherein said stack comprises an axis through a center of each fuel cell and said common collector channel runs parallel to said axis of said stack.

24. (new) The fuel cell stack of claim 18, wherein said channels have a width of approximately 2mm.

25. (new) The fuel stack of claim 12, wherein said channels have a length in the range 20 mm to 200 mm.

26. (new) The fuel stack of claim 12, wherein said channels are arranged such that an adequate supply of coolant is drawn by a vacuum or negative pressure of 0.1 to 10 bar.

27. (new) The fuel cell stack of claim 12, wherein said common collector channel is formed by an enclosure along an edge of said each one of said fuel cells.